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09/818,427	08/23/2001	Ali Bani-Hashemi	2001 P 05443 US	1376

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Siemens Corporation  
Intellectual Property Department  
186 Wood Avenue South  
Iselin, NJ 08830

EXAMINER
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BRIER, JEFFERY A

ART UNIT	PAPER NUMBER
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2628

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/12/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

09/818,427

Applicant(s)

BANI-HASHEMI ET AL.

Examiner

Jeffery A. Brier

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13, 16-23, 25, 26, 29-35 and 37-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13, 16-23, 25, 26, 29-35 and 37-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. The amendment filed on 11/16/2006 has been entered. The amendments to the claims appears to be maintaining a line of demarcation between the 09/818,388, now US patent no. 7,176,936, and this application, thus, the double patenting warning is overcome. The amendments to the claims also overcome the 35 USC 112 first paragraph rejection but do not clearly claim the invention as discussed below under 35 USC 112 second paragraph.

### ***Response to Arguments***

2. Applicant's arguments filed 11/16/2006 have been fully considered but they are not persuasive.

The arguments concerning applicants admitted prior art are not persuasive because applicants characterization of the prior art discussed in the specification at pages 1-5 as being limited to fluor-guided medical procedures (i.e, X-ray procedures) is unduly limiting since the pages 1-5 discuss prior art systems which are not limited to fluor-guided medical procedures and which are similar to applicants system which use the same see-through head mounted display or video-see-through head mounted display that applicant uses, see specification at page 44 lines 19-22, to merge computer generated graphical path guides and target with actual instrument and actual object. Additionally the specification at pages 34-36 compares the prior art bulls eye with applicants bulls eye, however, both methods merge a computer generated bulls eye

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and target onto the view of the actual instrument and actual object. Therefore, the admitted prior art teaches the rejected claims. Thus, the claims need to be amended to claim a system that does not read on the disclosed prior art method for facilitating the user's instrument positioning by using augmented reality.

The arguments concerning Kienzle at pages 11-13 are not persuasive because the claims do not claim how the real instrument and real object is displayed to the user due to the word "contains" and in view of steps 735, 740, 750 of figure 7 and in view of step 2308 of figure 23 where applicant displays the real instrument graphically. Thus, the graphical display of the X ray image with the graphical representation of the real instrument along with the graphical representation of the target and the path teaches the claim.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 13, 16-23, 25, 26, 29-35, and 37-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13:

At lines 7-8 this claim claims "displaying the rendered at least one graphics path guide on a display overlaid onto a view that contains said real instrument and a real object". The same limitation is present at lines 11-12. This claim limitation does not

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claim the type of display, actual or within the computer such as rendering, and does not claim how the real instrument and real object is displayed to the user with the virtual instrument and virtual target point due to the word "contains" and in view of steps 735, 740, 750 of figure 7, in view of step 2308 of figure 23 (step 2308 is described at page 50 lines 14-17), in view of page 45 lines 7-9, and in view of page 53 lines 10-19 and the claimed display is not limited to the display at page 44 line 16 to page 45 line 26. It is also not clear whom or what performs the "aligning the real instrument with the path" at line 14 and "moving said real instrument along the path" at line 17. At line 11 "a display" is claimed and at lines 7-8 "a display" is also claimed, thus, making line 11 indefinite since line 11 does not clearly refer to the display of lines 7-8 or to a new display.

Claim 16:

This claim has similar problems that claim 13 has due to substantially similar claim amendments and the discussion of claim 13 is modified to more closely correlate to the claim language found in this claim. At lines 5-8 this claim claims "rendering a graphical representation ...on a display overlaid onto a view that contains said real instrument and a real object". The same limitation is present at lines 17-18. This claim limitation does not claim the type of display, actual or within the computer such as rendering, and does not claim how the real instrument and real object is displayed to the user with the virtual instrument and virtual target point due to the word "contains" and in view of steps 735, 740, 750 of figure 7, in view of step 2308 of figure 23 (step 2308 is described at page 50 lines 14-17), in view of page 45 lines 7-9, and in view of page 53 lines 10-19 and the claimed display is not limited to the display at page 44 line 16 to

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page 45 line 26. It is also not clear whom or what performs the “aligning the actual instrument to the actual path” at line 14. At line 17 “a display” is claimed and at line 7 “a display” is also claimed, thus, making line 17 indefinite since line 17 does not clearly refer to the display of line 7 or to a new display.

Claim 23:

This claim has similar problems that claim 13 has due to substantially similar claim amendments and the discussion of claim 13 is modified to more closely correlate to the claim language found in this claim. At lines 7-9 this claim claims “rendering a graphical representation ...to obtain a virtual instrument and a virtual target point on a display overlaid onto a view that contains said real instrument and a real object”. At line 17 the virtual instrument and virtual target point are displayed and at lines 21-24 the graphical representation of the actual target point and the actual path are viewed in the form of a graphical target point and at least one graphical axis marker on a display along with the view of an actual scene along the actual path but it is not clear if this is the same displaying found at lines 7-9 that contains the real instrument and real object. This claim limitation does not claim the type of display, actual or within the computer such as rendering, and does not claim how the real instrument and real object is displayed to the user with the virtual instrument and virtual target point due to the word “contains” and in view of steps 735, 740, 750 of figure 7, in view of step 2308 of figure 23 (step 2308 is described at page 50 lines 14-17), in view of page 45 lines 7-9, and in view of page 53 lines 10-19 and the claimed display is not limited to the display at page 44 line 16 to page 45 line 26. At lines 23-24 “a display” is claimed and at lines 8-9 “a

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display” is also claimed, thus, making lines 23-24 indefinite since lines 23-24 does not clearly refer to the display of lines 8-9 or to a new display.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 13, 16-20, 23, 25, 26, 29, 30, 35, 37, 39, 41, 42, and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by applicants admission of the prior art. See applicants specification at pages 1-5 and page 34 line 16 to page 36 line 8. Applicants admission discusses using several types of graphical markers in the augmented reality display to allow the user to align the actual instrument with the path needed to be taken to place the instrument onto the actual target.

Claim 13:

Applicants admission of the prior art bulls eye graphical marker teaches a method for augmented reality guided instrument positioning, comprising the steps of:

rendering at least one graphics path guide for indicating a path for a real instrument to follow to a target, the graphics path guide being constructed in a way that it frames the path so as not to obstruct a view of a central part of the real instruments if the real instruments is in correct alignment to said path (*Bulls eye.*);

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displaying the rendered at least one graphics path guide on a display overlaid onto a view that contains said real instrument and a real object, which includes said target (*display 124, page 34 line 16 to page 36 line 8*);

moving said real instrument by a user in response to viewing the displayed at least one graphic path guide on a display overlaid onto a view that contains said real instrument and a real object, which includes said target to align it with the at least one graphics path guide, (*page 34 line 16 to page 36 line 8*),

aligning the real instrument with the path by determining when the at least one graphics path guide frames the path so that a view of a central part of the real instrument is not obstructed by the at least one graphics path guide (*Bulls eye.*); and

moving said real instrument along the path so that a front portion of said real instrument is inserted into the object until its tip reaches said target (*page 34 line 16 to page 36 line 8*).

Claim 16:

Applicants admission of the prior art bulls eye graphical marker teaches a method for augmented reality guided instrument positioning, comprising the steps of:

defining a point on an actual target (*page 34 line 16 to page 36 line 8*);

defining an actual path to reach the point on the actual target (*page 34 line 16 to page 36 line 8*);

rendering a graphical representation of the actual target point and the actual path in the form of a graphical target point and at least one graphical axis marker on a display overlaid onto a view that contains said real instrument and a real object, which



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includes said target, respectively, the graphical representation being rendered with respect to a user's augmented reality viewpoint, wherein the augmented reality view combines a view of an actual scene with said graphical representation and the augmented reality line of sight to the graphical target point coincides with the actual path that the actual instrument needs to be aligned to during a positioning of the actual instrument to the actual target point (*page 34 line 16 to page 36 line 8*); and

aligning the actual instrument to the actual path by aligning it to the augmented reality line of sight towards the graphical target point, and moving the actual instrument by a user in response to viewing the rendered graphical representation on a display overlaid onto a view that contains said real instrument and a real object, which includes said target along the actual path towards the actual target point while keeping it aligned with the augmented reality line of sight (*page 34 line 16 to page 36 line 8*).

Claim 17:

Inherently the actual instrument includes at least one physical axis marker for alignment with said at least one graphical axis marker.

Claim 18:

Inherently the actual instrument includes at least one physical axis marker for alignment with said at least one graphical axis marker.

Claim 19:

Page 34 line 16 to page 36 line 8 teaches a user makes the augmented reality line of sight coincide with the actual path by moving into a position where said graphical target point and said at least one graphical axis marker line up.

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Claim 20:

Page 34 line 16 to page 36 line 8 teaches the at least one identified graphical axis marker has a circular shape, and is centered on the axis of the actual path.

Claim 23:

Applicants admission of the prior art bulls eye graphical marker teaches a method for virtual reality guided instrument positioning, comprising the steps of:

defining a point on an actual target (*page 34 line 16 to page 36 line 8*);

defining an actual path to reach the point on the actual target (*page 34 line 16 to page 36 line 8*);

tracking a pose of an actual instrument with respect to a pose of the actual target (*page 34 line 16 to page 36 line 8*);

rendering a graphical representation of the actual instrument and the actual target point to obtain a virtual instrument and a virtual target point on a display overlaid onto a view that contains said real instrument and a real object, which includes said target, respectively, the graphical representation being rendered with respect to a virtual viewpoint from which a virtual line of sight to the virtual target point coincides with a virtual path for the virtual instrument to follow during a positioning of the actual instrument to the point on the actual target, the virtual path corresponding to the actual path, the virtual instrument comprising a 3D structure for line of sight alignment, the 3D structure comprising a plurality of markers centered on and distributed along an axis of the virtual instrument (*page 34 line 16 to page 36 line 8*);

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displaying the rendered virtual instrument and virtual target point (*display 124, page 34 line 16 to page 36 line 8*);

aligning the virtual instrument along the virtual line of sight to the virtual target point in order to accordingly align the actual instrument along the actual path (*page 34 line 16 to page 36 line 8*); and

moving the actual instrument by a user in response to viewing the rendered graphical representation of the actual target point and the actual path in the form of a graphical target point and at least one graphical axis marker on a display along with the view of an actual scene along the actual path towards the actual target keeping the correct alignment by observing and keeping the alignment of virtual instrument and virtual path (*page 34 line 16 to page 36 line 8*).

Claim 25:

Page 34 line 16 to page 36 line 8 teaches the virtual target point has a circular shape (a center of a target implies a circular target, page 35 line 7.).

Claim 26:

Page 34 line 16 to page 36 line 8 teaches wherein the circular shape is a ring.

Claim 29:

Page 34 line 16 to page 36 line 8 teaches said plurality of markers comprise at least two rings, centered on an axis of the virtual instrument.

Claim 30:

The bulls eye of page 34 line 16 to page 36 line 8 teaches the two rings have different diameters.

Claim 35:

Page 34 line 16 to page 36 line 8 teaches wherein the rendering step further comprises the step of rendering graphical information about a distance between the actual instrument and the point on the actual target, the graphical information about the distance being overlaid onto the graphical representation.

Claim 37:

Page 34 line 16 to page 36 line 8 teaches wherein the virtual target point and the virtual instrument are designed such that information corresponding to the distance between the actual instrument and the point on the actual target can be directly observed from an alignment of the virtual target point and the virtual instrument.

Claim 39:

Page 34 line 16 to page 36 line 8 teaches wherein the virtual target point and the virtual instrument are each comprised of at least one ring centered on the target point respectively on the axis of the instrument, and a diameter of the at least one ring is dimensioned to achieve a pre-defined configuration together with the actual instrument when the actual instrument reaches the actual target.

Claim 41:

Page 34 line 16 to page 36 line 8 teaches wherein said graphical representation from the virtual viewpoint is combined with an augmented reality view.

Claim 42:

Page 34 line 16 to page 36 line 8 teaches wherein the graphical target point and the graphical axis marker are designed such that information corresponding to the

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distance between the actual instrument and the point on the actual target can be directly observed from an alignment of the graphical target point and the graphical axis marker.

Claim 43:

Page 34 line 16 to page 36 line 8 teaches wherein the graphical target point and the graphical axis marker are each comprised of at least one ring centered on the target point respectively on the axis of the instrument, and a diameter of the at least one ring is dimensioned to achieve a pre-defined configuration together with the actual instrument when the actual instrument reaches the actual target.

7. Claims 16, 22, 23, 31-35, 37, and 40-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Kienzle, III. US PGPub application no. 2002/ 0077540.

Claim 16:

Kienzel teaches a method for augmented reality guided instrument positioning, comprising the steps of:

defining a point on an actual target (figure 7, 159);

defining an actual path to reach the point on the actual target (156);

rendering a graphical representation of the actual target point (159) and the actual path (156) in the form of a graphical target point and at least one graphical axis marker (156 or 131 or 211) on a display overlaid onto a view that contains said real instrument and a real object, which includes said target, respectively, the graphical representation being rendered with respect to a user's augmented reality viewpoint, wherein the augmented reality view combines a view of an actual scene with said

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graphical representation and the augmented reality line of sight to the graphical target point coincides with the actual path that the actual instrument needs to be aligned to during a positioning of the actual instrument to the actual target point (figures 4-7, 11, and 12); and

aligning the actual instrument to the actual path by aligning it to the augmented reality line of sight towards the graphical target point, and moving the actual instrument by a user in response to viewing the rendered graphical representation on a display overlaid onto a view that contains said real instrument and a real object, which includes said target along the actual path towards the actual target point while keeping it aligned with the augmented reality line of sight (*The user moves the instrument in response to viewing the display which shows the alignment of the instrument with the required path.*).

Claim 22:

Kienzel teaches the method according to claim 16, wherein the at least one identified graphical axis marker comprises at least two axis markers for controlling alignment of the actual instrument along a line of sight (see figures 4-7, 11, and 12 ).

Claim 23:

This claim is similar to claim 16 and it is rejected for the same reasons.

Claim 31:

Kienzel teaches the method of claim 23, wherein the step of aligning the virtual instrument further comprises the step of choosing an orientation of the graphical representation around the virtual line of sight according to a pose of a user with respect

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to the actual target (*by sensing the orientation of the real instrument the system has sensed the pose of the user*).

Claim 32:

Kienzel teaches the method of claim 31, further comprising the step of determining the orientation such that east, west, north, and south correspond to right, left, forward, and backward, respectively, for the pose of the user in which the user faces the actual target, said determining step based on a selection (*by sensing the orientation of the real instrument the system has sensed the pose of the user*).

Claim 33:

Kienzel teaches the method of claim 31, wherein the orientation is dynamically adjusted according to a change of the pose of the user (*by sensing the orientation of the real instrument the system has sensed the pose of the user*).

Claim 34:

Kienzel teaches the method of claim 32, wherein the selection is dynamically adjusted with respect to the pose of the user (*by sensing the orientation of the real instrument the system has sensed the pose of the user*).

Claim 35:

Kienzel teaches the method of claim 23 wherein the rendering step further comprises the step of rendering graphical information about a distance between the actual instrument and the point on the actual target, the graphical information about the distance being overlaid onto the graphical representation by graphically displaying the

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instrument as it is moved by the user relative to the target which shows the distance graphically.

Claim 37:

Kienzel teaches the method of claim 23 wherein the virtual target point and the virtual instrument are designed such that information corresponding to the distance between the actual instrument and the point on the actual target can be directly observed from an alignment of the virtual target point and the virtual instrument by graphically displaying the instrument as it is moved by the user relative to the target which shows the distance graphically.

Claim 40:

Kienzel teaches the method of claim 23, wherein the graphical representation from the virtual viewpoint is combined with another graphical representation from another virtual viewpoint looking at the virtual path from a side thereof with reference to figures 4-7, 11, and 12.

Claim 41:

Kienzel teaches the method of claim 23, wherein said graphical representation from the virtual viewpoint is combined with an augmented reality view with reference to figures 4-7, 11, and 12.

Claim 42:

Kienzel teaches the method of claim 16 wherein the graphical target point and the graphical axis marker are designed such that information corresponding to the distance between the actual instrument and the point on the actual target can be directly



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observed from an alignment of the graphical target point and the graphical axis marker by graphically displaying the instrument as it is moved by the user relative to the target which shows the distance graphically.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kienze, III. US PGPub application no. 2002/ 0077540 and applicants admission of the prior art and motivation of using aiming aids of guns with instrument guidance found at page 38 lines 7-16. Kienzel does not teach the graphical axis marker comprises an intersection of at least two lines, the intersection to be centered on the axis of the actual instrument for correct alignment.

It would have been obvious to one of ordinary skill in the art to use the feature of gun aiming, the cross, and apply it to augmented reality aiming of real instruments because this will give the user a good idea of the alignment of the real instruments with the real target.

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10. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kienze, III. US PGPub application no. 2002/ 0077540. Kienzel does not teach rendering by using a virtual camera with a wide angle lens. Page 50 line 24 to page 51 line 4 of applicants specification does not give a reason for rendering by using a virtual camera with a wide angle lens.

It would have been obvious to one of ordinary skill in the art to render by using a virtual camera with a wide angle lens because this is one of many ways to render the graphical images and because applicant did not give any reason for choosing this type of rendering.

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffery A Brier whose telephone number is (571) 272-7656. The examiner can normally be reached on M-F from 7:00 to 3:30. If attempts to

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reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi, can be reached at (571) 272-7664. The fax phone Number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffery A Brier  
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Division 2628